

CLAIMS

What is claimed is:

1. A chuck assembly for holding a sample comprising:

a shaft;

a generally circular chuck member, said shaft extending from a first surface of said chuck member;

a sample holder associated with a second surface of said chuck member, said second surface being opposite said first a surface; and

a sample receiving assembly for holding the sample on the sample holder so that the sample remains fixed to the sample holder when the shaft rotates and causes said chuck member and sample holder to rotate with the shaft.

2. The apparatus of Claim 1 wherein said chuck member has, at a periphery of the chuck member, means for propelling a fluid.

3. The apparatus of Claim 1 wherein said chuck member is generally shaped as a squat cylinder, and said chuck member has a plurality of grooves, said grooves extending along an outer surface of said cylinder, said grooves being at an acute angle with respect to a longitudinal axis of said chuck member.

4. The apparatus of Claim 3 wherein said chuck member has a plurality of openings extending therethrough in a direction parallel to a longitudinal axis of said chuck member.

5. The apparatus of Claim 4 in combination with:

a reactor chamber for receiving said chuck assembly;

a spindle assembly for receiving an end of said shaft distal from said chuck member; and

a motor for rotating said spindle assembly and said shaft so that said fluid flows generally along said shaft in a first direction and through said openings in said chuck member around said sample holder and then along a wall of said chamber in a second direction generally opposite to said first direction.

6. The apparatus of Claim 5 wherein said chamber is cylindrical and said fluid flows along a wall of said chamber in said second direction.

7. The apparatus of Claim 5 further comprising:

a first opening through which a reaction fluid is introduced into said chamber; and

a second opening through which said reaction fluid is removed from said chamber.

8. The apparatus of Claim 7 wherein said first opening is disposed proximate said shaft and said second opening is disposed proximate the wall of said chamber.

9. The apparatus of Claim 5 further comprising:

temperature control means for controlling the temperature of said reactor chamber.

10. The apparatus of Claim 9 wherein said temperature control means comprises:

a mantle surrounding said reactor chamber; and
a controller for controlling the temperature of said
mantle.

11. The apparatus of Claim 9 wherein said
temperature control means controls the temperature of
said reactor chamber so that said reactor chamber is at a
temperature of between 0°C and 150°C.

12. The apparatus of Claim 1 wherein said sample
receiving assembly comprises at least one clip for
holding the sample to said sample holder.

13. The apparatus of Claim 12 wherein said sample
holder has a plurality of through holes formed therein.

14. The apparatus of Claim 13 wherein at least one
of said through holes receives a fastener for securing
said clip to the sample holder.

15. The apparatus of Claim 5, further comprising:
pressurizing apparatus for pressurizing said reactor
chamber.

16. The apparatus of Claim 15 wherein said
pressurizing apparatus pressurizes said chamber to a
pressure of up to 10,000 psi.

17. The apparatus of Claim 15 wherein said
pressurizing apparatus comprises a compressed gas
cylinder.

18. The apparatus of Claim 15 wherein said
pressurizing apparatus includes a high pressure pump.

19. The apparatus of Claim 5 wherein said fluid is supercritical carbon dioxide.

20. The apparatus of Claim 19 wherein said fluid further comprises an organic solvent.

21. The apparatus of Claim 1 wherein said sample holder is a rectangular plate.

22. The apparatus of Claim 21 wherein said plate has a plurality of through holes formed thereon.

23. The apparatus of Claim 22, wherein said sample receiving assembly comprises at least one clip for holding the sample to said sample holder.

24. The apparatus of Claim 23, wherein at least one of said through holes receives a fastener for securing said clip to the sample holder.

25. An apparatus including a chuck assembly for holding a sample, and a reactor chamber, said apparatus comprising:

a shaft;

a generally circular chuck member, said shaft extending from a first surface of said chuck member;

a sample holder associated with a second surface of said chuck member, said second surface being opposite said first a surface;

a reactor chamber for receiving said chuck assembly;

a spindle assembly for receiving an end of said shaft distal from said chuck member; and

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a motor for rotating said spindle assembly and said shaft so that fluid in said chamber flows generally along said shaft in a first direction and through said openings in said chuck member around said sample holder and then along a wall of said chamber in a second direction generally opposite to said first direction.